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## (54) Cutting unit.

(57) The invention relates to a cutting unit for cutting hair, for example, as used in a shaver, comprising a first (1) and a second cutting member (2), each having teeth (4, 5) and at least one of the cutting members can be driven so as to perform a reciprocating movement with respect to the other cutting member, the second cutting member (2) being present between the first cutting member (1) and a locking member (3). The first cutting member (1) and the locking member (3) are connected together by means of spacers (8, 9).

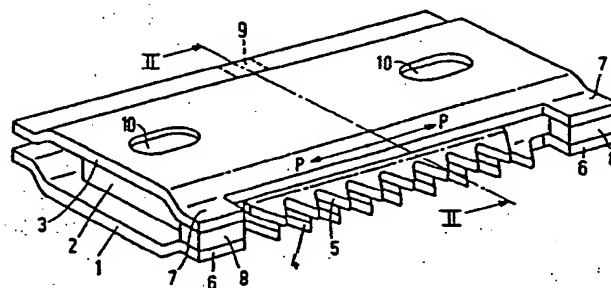


FIG.1

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## Cutting unit.

The invention relates to a cutting unit for cutting hair as used, for example in a shaver, having a first and a second cutting member each comprising teeth and at least one of the cutting members can be driven so as to reciprocate with respect to the other cutting member, the second cutting member being present between the first cutting member and a locking member.

Such a cutting unit is known, for example, from Netherlands Patent Application 7404738 (PHN 7458 - US-PS 3,962,785). In this known construction the cutting members are forced on each other by means of a resilient element which is connected to the locking member. This pressure force is necessary to counteract those forces which occur instantaneously when a hair is cut and by which the cutting members would be urged apart. The pressure force of the resilient element of the known construction is present continuously and causes loss of energy and detrition of the moving parts.

It is the object of the invention to avoid this disadvantage and the invention is characterized in that the first cutting member and the locking member are connected together by means of spacing members.

Special embodiments are claimed in the sub-claims. The invention will now be described in greater detail with reference to a description of an embodiment shown in the Figures.

Figure 1 is a perspective view of a cutting unit according to the invention.

Figure 2 is a sectional view taken on the line II-II of Figure 1.

Figure 3 is a plan view of a basic form of sheet material which comprises a cutting member and spacing members.

The cutting unit shown in Figures 1 and 2 comprises a first cutting member 1, a second cutting member 2 and a locking member 3. The cutting members 1 and 2 comprise teeth 4 and 5, respectively. The second cutting member 2 is present between the first cutting member 1 and the locking member 3 and can be driven so as to perform a reciprocating element in the directions of the arrow P with respect to the first cutting member by means of a driving mechanism known per se. Such a cutting unit is used, for example, in an apparatus for cutting long hair, a so-called trimmer, but it may also be used as an auxiliary tool in shavers.

The first cutting member 1 comprises lugs 6 which bound the row of teeth 4. The locking member 3 also comprises lugs 7 which are situated opposite to the lugs 6. A spacing member 8 is present between each pair of lugs 6 and 7. More-

over a corresponding spacing member 9 is present between the first cutting member 1 and the locking member 3 on the side of the cutting unit opposite to the teeth. The locking member 3 comprises elongate apertures 10 through which the second cutting member 2 can be driven. The second cutting member 2 comprises for this purpose corresponding coupling apertures 11. The first cutting member 1 and the locking member 3 and the spacers 8, 9 may be connected to form one assembly by means of known connection elements, for example bolt and nut connections. It is also possible to weld these components together or, in a detachable construction, to cause them to engage each other in a clamping manner by means of a resilient element. The spacers 8, 9 are in that case connected, for example, only to the first cutting member.

On the front of the cutting unit near the teeth 4, 5 the second cutting member 2 is present between the guide faces 12 and 13 on the first cutting member 1 and the locking member 3, respectively. On the oppositely located rear side of the cutting unit, on each side of spacer 9, protecting parts 14 of the second cutting member 2 are present (see also Figure 3) between the guide faces 15 and 16 of the first cutting member 1 and the locking member 3, respectively.

The thickness D (Figure 2) of the spacers 8, 9 is chosen to be so that the second cutting member 2 can reciprocate with a very small amount of play between the guide faces 12, 13 and 15, 16. The force K necessary to prevent the second cutting member 2 from being forced away from the first cutting member 1 during cutting a hair is exerted by the locking member 3 substantially via the guide face 13 on the second cutting member 2. This force K occurs only when this is necessary namely when a hair is cut, and is present in the most favourable place, namely near the teeth 4, 5. An extra resilient element for urging the cutting members together thus is superfluous in this construction and detrition and frictional losses are considerably reduced.

For the end in view it is of importance for the thickness of the spacers 8, 9 to correspond as much as possible to the thickness of the cutting member 2. For this purpose the cutting member 2 and the spacers 8, 9 are preferably manufactured from the same basic form of sheet material. Such a basic form is shown in Figure 3. The spacers 8, 9 are still connected to the second cutting member 2 by means of the arms 17. The locking member 3 is also shown in Figure 3 by broken lines. As may be seen from the Figures the arms 17 are situated

outside the contours of the locking member 3. The first cutting member 1, the locking member 3 and the basic form as shown in Figure 3 can now be placed on top of each other and be welded together at the area of the spacers 8, 9. The arms projecting beyond the assembly may then be cut at 18. In this manner it is achieved that the thickness of the spacers 8, 9 corresponds accurately to the thickness of the second cutting member 2. After some running-in, if any, a light-running construction is obtained having very good cutting properties since the pressure force K will occur without the cutting members being urged apart noteworthy and a so-called cutting gap between the cutting members 1 and 2 will substantially not occur.

### Claims

1. A cutting unit for cutting hair, for example, as used in a shaver, comprising a first and a second cutting member each comprising teeth and at least one of the cutting members can be driven so as to perform a reciprocating movement with respect to the other cutting member, the second cutting member being present between the first cutting member and a locking member, characterized in that the first cutting member and the locking member are connected together by means of spacers.

2. A cutting unit as claimed in Claim 1, characterized in that spacers are present near the teeth of the cutting member.

3. A cutting unit as claimed in Claim 1 or 2, with a second cutting member manufactured from sheet material, characterized in that the size of the spacers which determines the spacing between the first cutting member and the locking member corresponds to the thickness of the second cutting member.

4. A cutting member as claimed in Claim 3, characterized in that during the manufacture the second cutting member is a part of a basic form of sheet material which also comprises the spacers.

5. A shaver, characterized in that it comprises a cutting unit as claimed in any of the preceding Claims.

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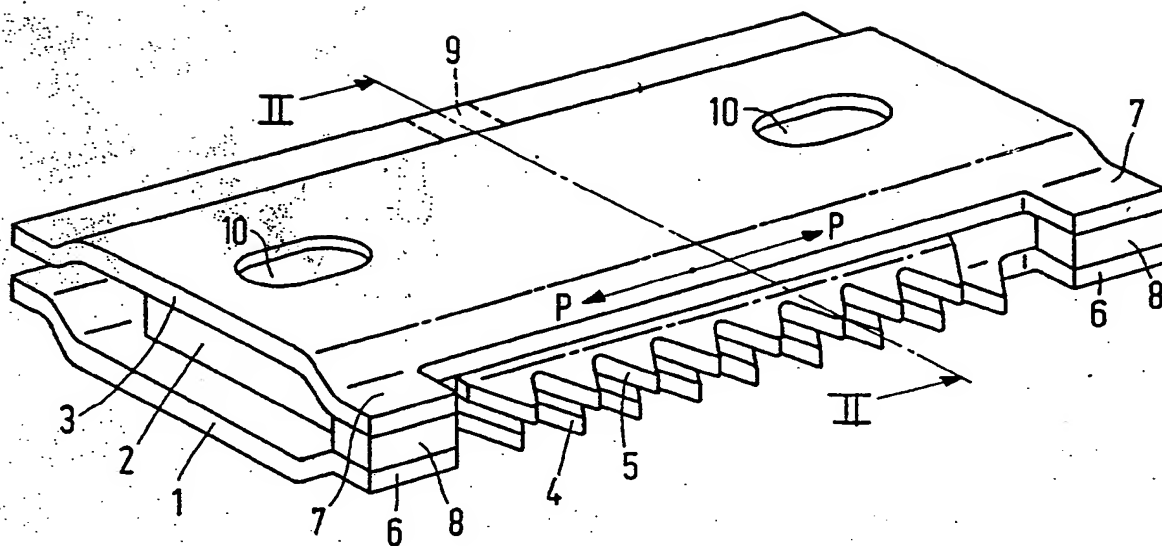


FIG. 1

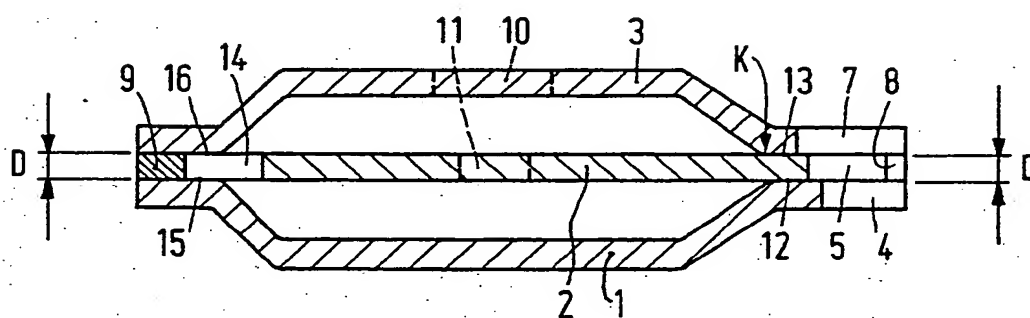


FIG. 2

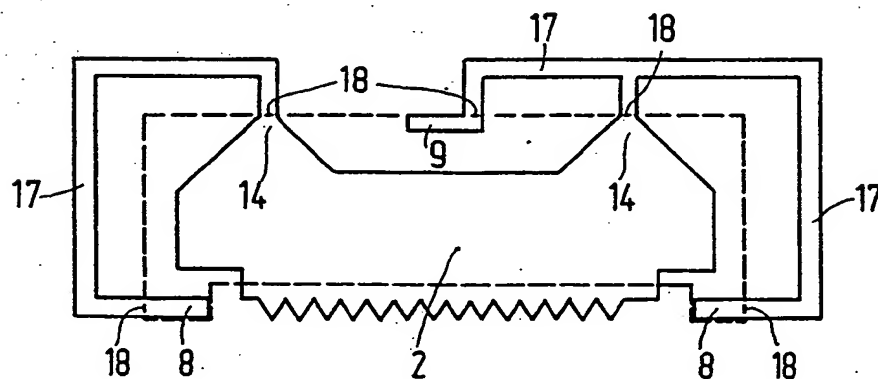


FIG. 3



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# EUROPEAN SEARCH REPORT

Application Number

EP 88 20 0333

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-1 519 636 (SERENE) * Page 1, line 48 - page 2, line 37; figures 1-10 *	1,2,5	B 26 B 19/06
X	US-A-4 563 814 (TRICHELL) * Column 3, line 3 - column 4, line 27; figures 1-4 *	1,2,5	
X	GB-A-1 116 298 (POPP) * Page 1, line 35 - page 3, line 32; figure *	1,2,5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 26 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-06-1988	Examiner ERNST R.T.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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